

**WHAT IS CLAIMED IS:**

- 1 1. An apparatus for retreading tires, comprising:  
2 a tire casing mount configured to have a tire casing  
3 mounted thereto;  
4 a cushion gum applicator configured to stretch a  
5 length of cushion gum onto the tire casing;  
6 a tread dispenser configured to automatically dispense  
7 a length of tire tread based on the circumference of at least one of the tire  
8 casing and the tire casing plus the cushion gum; and  
9 a tread applicator configured to stretch the length of  
10 tire tread onto the cushion gum,  
11 wherein the cushion gum applicator, the tread  
12 dispenser, and the tread applicator are integrated into a single machine.
- 1 2. The apparatus of claim 1, further comprising:  
2 a measuring device configured to measure at least one  
3 of the circumference of the tire casing and the cushion gum.
- 1 3. The apparatus of claim 1, wherein the tread dispenser  
2 comprises:  
3 a tread cutter, configured to cut the tread to a  
4 determined length.
- 1 4. The apparatus of claim 1, wherein the tread dispenser  
2 comprises:  
3 a curved track for guiding the length of tire tread.
- 1 5. The apparatus of claim 1, wherein the tread dispenser  
2 comprises:  
3 a first clamp for clamping the length of tire tread  
4 adjacent a first end; and

5 a second clamp for clamping the length of tire tread  
6 adjacent a second end.

1 6. An apparatus for retreading tires, comprising:  
2 a rotatable hub for mounting a tire casing;  
3 a cushion gum applicator configured to stretch a  
4 length of cushion gum onto the tire casing, the stretch being controlled  
5 during application;  
6 a tread dispenser configured to automatically dispense  
7 a length of tire tread based on the circumference of at least one of the tire  
8 casing and the tire casing plus the cushion gum; and  
9 a tread applicator configured to apply the length of tire  
10 tread onto the cushion gum.

1 7. The apparatus of claim 6, further comprising:  
2 a measuring device configured to measure the  
3 circumference of the tire casing.

1 8. The apparatus of claim 7, wherein the hub is rotated  
2 at an angular rate based on the circumference of the tire casing.

1 9. The apparatus of claim 6, further comprising:  
2 a rotatable spindle configured to dispense a length of  
3 cushion gum from a roll mounted on the spindle.

1 10. The apparatus of claim 9, wherein the hub is rotated  
2 at a first angular rate, the spindle is rotated at a second angular rate, and  
3 the second angular rate is proportional to the first angular rate.

1 11. The apparatus of claim 9, wherein the hub is rotated  
2 at a first angular rate and a point on the perimeter of the tire casing has a  
3 first tangential velocity, the spindle is rotated at a second angular rate and  
4 a point on the perimeter of the roll has a second tangential velocity, and

5 the first tangential velocity minus the second tangential velocity provide a  
6 nonnegative differential velocity.

1 12. The apparatus of claim 11, wherein the differential  
2 velocity is substantially constant during application of the cushion gum.

1 13. An apparatus for retreading tires, comprising:  
2 a hub for mounting a tire casing;  
3 a cushion gum applicator configured to stretch a  
4 length of cushion gum onto the tire casing;  
5 a tread dispenser configured to automatically dispense  
6 a length of tire tread based on the circumference of at least one of the tire  
7 casing and the tire casing plus the cushion gum, the length of tire tread  
8 having a first end and a second end and a periodically repeating tread  
9 pattern;  
10 a tread cutter configured to cut the tread to a  
11 determined length; and  
12 a tread applicator configured to apply the length of tire  
13 tread onto the cushion gum.

1 14. The apparatus of claim 13, wherein the determined  
2 length is specified by an operator.

1 15. The apparatus of claim 13, wherein the determined  
2 length is based on matching the pattern at the first end with the pattern  
3 at the second end of the tire tread.

1 16. The apparatus of claim 13, wherein the determined  
2 length may be automatically specified.

1 17. The apparatus of claim 16, wherein the tread cutter is  
2 configured to automatically cut the tread to the determined length.

1 18. The apparatus of claim 13, wherein the tread  
2 applicator monitors the length of tire tread that has been applied to the  
3 cushion gum and the length of tire tread that has yet to be applied.

1 19. The apparatus of claim 13, wherein the tread  
2 applicator is configured to stretch the tire tread onto the cushion gum.

1 20. The apparatus of claim 13, wherein the tread  
2 applicator is configured to stretch the tire tread onto the cushion gum, the  
3 stretch being controlled such that the gap, between the first end and the  
4 second end when the tire tread has been applied to the cushion gum, is  
5 within a predetermined range of distances.

1 21. The apparatus of claim 13, wherein the tread  
2 applicator includes an applicator roller.

1 22. The apparatus of claim 21, wherein the applicator  
2 roller is configured to apply the tread to the cushion gum with a variably  
3 controlled force.

1 *Sub* 23. A method of retreading tires, comprising:  
2 *037* mounting a tire casing on a hub, the hub being  
3 rotatable;  
4 stretching a length of cushion gum around the  
5 circumference of the tire casing, the stretch being controlled during  
6 application;  
7 measuring the circumference of the tire casing with  
8 the cushion gum applied;  
9 dispensing, automatically, a length of tire tread based  
10 on the circumference of the tire casing with the cushion gum applied; and  
11 applying the length of tire tread to the cushion gum,

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12 wherein the stretching, measuring, dispensing, and  
13 applying are performed on an integrated machine.

1 ~~24. The method of claim 23, further comprising:~~  
2 ~~measuring the circumference of the tire casing.~~

1 ~~25. The method of claim 24, further comprising:~~  
2 ~~rotating the hub at an angular rate based on the~~  
3 ~~circumference of the tire casing.~~

1 ~~26. The method of claim 23, further comprising:~~  
2 ~~cutting the tire tread to an automatically determined~~  
3 ~~length.~~

1 ~~27. The method of claim 23, further comprising:~~  
2 ~~cutting the tire tread to an operator determined length.~~

1 ~~28. The method of claim 23, further comprising:~~  
2 ~~cutting the tire tread to a length based on the tire~~  
3 ~~tread design.~~

1 ~~29. The method of claim 23, wherein applying the length~~  
2 ~~of tire tread includes controlling an application pressure.~~